

Article 19 And't

AMENDMENT UNDER Article 19(1)

1. (Amended) A scribing device for a brittle material substrate, which continuously heats a region along a line to be scribed on a surface of the brittle material substrate at a temperature lower than a softening point of the brittle material substrate and, also, continuously cools a region in the vicinity of the heated region, thereby forming a blind crack along said line to be scribed, said scribing device characterized by comprising:
 - 10 a light projection unit which emits light;
an optical fiber which is arranged such that emitted light from said light projection unit is reflected on a lower face of said brittle material substrate and, then, enters the region of the blind crack formation in the
15 vicinity of the cooled region on the surface of said brittle material substrate;
a light reception unit which receives, through said optical fiber, the light emitted from said light projection unit through said optical fiber and reflected by
20 the blind crack; and
a determination unit which provides a window comparator so as to distinguish whether a level of light receiving signal obtained from said light reception unit is between predetermined thresholds or not, wherein
25 a shape state of the blind crack is checked based on

an output from said determination part.

2. (Cancelled)

3. (Cancelled)

5 4. (Cancelled)

5. (Amended) A scribing device for a brittle material substrate, which continuously heats a region along a line to be scribed on a surface of the brittle material substrate at a temperature lower than a softening point of the brittle material substrate and, also, continuously cools a region in the vicinity of the heated region, thereby forming a blind crack along said line to be scribed, said scribing device characterized by comprising:

15 a light projection unit which emits light;

a first optical fiber which is arranged such that emitted light from said light projection unit is reflected on a lower face of said brittle material substrate and, then, enters the region of the blind crack formation in the vicinity of the cooled region on the surface of said brittle material substrate;

20 a second optical fiber in which the light emitted from said light projection unit and, then, transmitted the blind crack enters;

25 a light reception unit which receives transmitted

light obtained from said second optical fiber; and

a determination unit which provides a window comparator so as to distinguish whether a level of light receiving signal obtained from said light reception unit is
5 between predetermined thresholds or not, wherein

a shape state of the blind crack is checked based on an output from said determination part.

6. (Cancelled)

10 7. (Cancelled)

8. (Cancelled)

9. (Amended) A scribing method for a brittle material substrate, in which a region along a line to be
15 scribed on a surface of a brittle material substrate is continuously heated at a temperature lower than a softening point of the brittle material substrate and, also, a region in the vicinity of the heated region is continuously cooled, so that a blind crack is formed along said line to be
20 scribed, said scribing method characterized by:

reflecting light, through an optical fiber, on a lower face of said brittle material substrate and, then, entering the reflected light into the region of the blind crack formation in the vicinity of the cooled region on the
25 surface of said brittle material substrate;

converting a light amount level of received light into a signal, after a reception, through said optical fiber, of light which is reflected by said blind crack; and

- performing scribing while making a good or bad
5 determination on a condition of the blind crack formation by distinguishing whether a level of light receiving signal is between predetermined thresholds or not.

10. (Cancelled)

- 10 11. (Cancelled)

12. (Amended) A scribing method for a brittle material substrate, in which a region along a line to be scribed on a surface of a brittle material substrate is
15 continuously heated at a temperature lower than a softening point of the brittle material substrate and, also, a region in the vicinity of the heated region is continuously cooled, so that a blind crack is formed along said line to be scribed, said scribing method characterized by:

- 20 reflecting light, through a first optical fiber, on a lower face of said brittle material substrate and, then, entering the reflected light into the region of the blind crack formation in the vicinity of the cooled region on the surface of said brittle material substrate;

- 25 converting a light amount level of received light

into a signal, after a reception, through a second optical fiber, of light which is transmitted by said blind crack; and

performing scribing while making a good or bad
5 determination on a condition of the blind crack formation by distinguishing whether a level of light receiving signal is between predetermined thresholds or not.

13. (Cancelled)

10 14. (Cancelled)

15 15. An automated breaking line for a brittle material substrate, characterized by comprising: at least one scribing device for a brittle material substrate according to claim 1; and at least one device for breaking the brittle material substrate.

20 16. An automated breaking line for a brittle material substrate, characterized by comprising: at least one scribing device for a brittle material substrate according to claim 5; and at least one device for breaking the brittle material substrate.